882E Video Test Generator

Quick Start Guide

Testing HDMI HDCP Compliance using the Encryption Status Tester (EST)

quantumdata

Running the HDCP compliance test for HDMI devices

Overview

The 882E-Analyzer (882EA) supports the running of an HDCP compliance test on HDCP-enabled HDMI sources, sinks and repeaters. The HDCP compliance test was developed while working closely with Digital Content Protection.

The HDCP compliance test system enables developers of HDMI products to perform a fast and comprehensive HDCP compliance test. Because the 882 can emulate HDMI HDCP sources, sinks and repeaters, it can perform a complete HDCP compliance tests on any HDCP capable HDMI source, sink or repeater.

The HDCP compliance test can be run entirely through the 882 front panel or through the command line. The HDCP commands enable you to run a specific subset of the tests in the series of tests.

When the tests are completed, an HTML report is issued and saved in the Reports directory of the external memory card (if the card is inserted in the 882E). The report has a summary and detail section. A Pass or Fail indication is provided for each test. In some cases the test report shows "Not Judged." The Not Judged result is regarded as a failure for compliance testing at an ATC.

Note: This document may be updated frequently. If you are using this document in printed form please be sure that you check the Quantum Data website for updates at: www.quantumdata.com/downloads/index.asp.

Encryption Status Tester

Some of the HDCP compliance tests for an HDMI source, sink and repeater device require the use of the standalone hardware device called the Encryption Status Tester (EST) (below). The EST device is currently only used for the 882E model. For the 882E, the EST device is connected into the test setup for all tests beginning with the 2.17.x release of the 882E model.

The following table lists the HDCP compliance tests that the EST is specifically used for.

Index	Test	EST Function
1	1A_01 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Measures the position of the encryption enable pulse.
10	1B_01 (Transmitter Downstream w/Repeater)	Measures the position of the encryption enable pulse.
19	2C_04 (Receiver Upstream w/Transmitter) (w/DVI Transmitter)	Positions the encryption enable pulse in the vsync or vertical blanking at three different locations (beginning, center and end.)

Index	Test	EST Function
20	3A_01 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Measures the position of the encryption enable pulse.
25	3B_01 (Repeater Downstream w/Repeater)	Measures the position of the encryption enable pulse.

List of Tests

The following table describes the HDCP compliance tests that can be performed.

Index	Test	Description
1	1A_01 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Regular Procedure: With HDMI Capable Receiver
2	1A_02 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Regular Procedure: HPD After Writing Aksv
3	1A_03 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Regular Procedure: HPD After Starting Third Part of Authentication
4	1A_04 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (First Part of Authentication) HDPC Port Access
5	1A_05 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (First Part of Authentication) Verify Bksv
6	1A_06 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (First Part of Authentication) Verify R0'
7	1A_07 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (Third Part of Authentication) Verify Ri'
8	1A_08 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: SRM. Requires SRM DVD disc.
9	1A_09 (Transmitter Downstream w/Receiver) w/DVI Receiver	Regular Procedure: With DVI Receiver
10	1B_01 (Transmitter Downstream w/Repeater)	Regular Procedure: With Repeater
11	1B_02 (Transmitter Downstream w/Repeater)	Regular Procedure: HPD After Reading R0'
12	1B_03 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Timeout of KSV List READY

Index	Test	Description
13	1B_04 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Verify V'
14	1B_05 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_DEVS EXCEEDED
15	1B_06 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_CASCADE EXCEEDED
16	2C_01 (Receiver Upstream w/Transmitter) (w/HDMI Capable Transmitter)	Regular Procedure: With HDMI Capable Transmitter
17	2C_02 (Receiver Upstream w/Transmitter) (w/HDMI Capable Transmitter)	Irregular Procedure: (First Part of Authentication) New Authentication
18	2C_03 (Receiver Upstream w/Transmitter) (w/HDMI Capable Transmitter)	Irregular Procedure: (Third Part of Authentication) New Authentication
19	2C_04 (Receiver Upstream w/Transmitter) (w/DVI Transmitter)	Regular Procedure: With DVI Transmitter
20	3A_01 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Regular Procedure: With HDMI Capable Receiver
21	3A_02 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) HDCP Port Access
22	3A_03 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) Verify Bksv
23	3A_04 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) Verify R0'
24	3A_05 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and DVI Receiver)	Regular Procedure: With DVI Receiver
25	3B_01 (Repeater Downstream w/Repeater)	Regular Procedure: With Repeater
26	3B_02 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Timeout of KSV List READY
27	3B_03 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Verify V'

Index	Test	Description
28	3B_04 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_DEVS_EXCEEDED
29	3B_05 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_CASCADE_EXCEEDED
30	3C_I_01 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Regular Procedure: Transmitter – DUT – Receiver
31	3C_I_02 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Regular Procedure: HPD Pulse Output Caused By User Operation
32	3C_I_03 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) New Authentication
33	3C_I_04 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Second Part of Authentication) New Authentication
34	3C_I_05 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Third Part of Authentication) New Authentication
35	3C_I_06 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Second Part of Authentication) Verify Bksv
36	3C_I_07 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Second Part of Authentication) Verify R0'
37	3C_II_01 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: Transmitter – DUT – Repeater-Receiver
38	3C_II_02 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: HPD After Writing Aksv
39	3C_II_03 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: HPD After Reading R0'

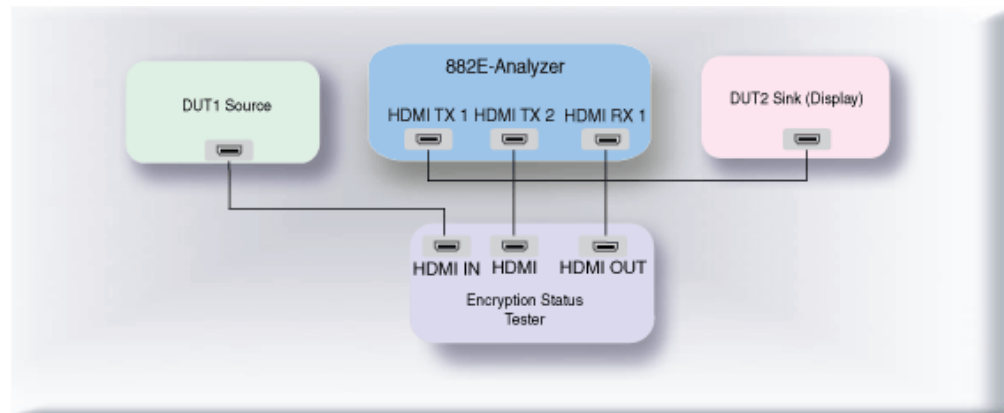| Index	Test	Description
40	3C_II_04 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: HPD After Starting Third Part of Authentication
41	3C_II_05 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) Verify V'
42	3C_II_06 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) DEVICE_COUNT
43	3C_II_07 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) DEPTH
44	3C_II_08 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_DEVS_EXCEEDED
45	3C_II_09 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_CASCADE_EXCEEDED

Running HDCP compliance test on HDMI transmitters

To run the 1A and 1B series HDCP compliance tests on an HDMI source (transmitter):

Note: *The 1A-08 test requires that you use the SRM disc for the 1A-08 test if the source device has an optical drive. Refer to "To run the 1A-08 HDCP compliance test using the SRM disc:" on page 13.*

1. Connect the cables as follows:

    a. Apply power to the Encryption Status Tester (EST) using the power adapter supplied with the EST.

    b. Connect an HDMI cable from the source device under test output to the EST HDMI port labeled, "HDMI IN."

    c. Connect an HDMI cable from the 882 HDMI Rx 1 port to the EST HDMI port labeled "HDMI OUT."

    d. Connect an HDMI cable from the 882 HDMI Tx 2 port to the EST HDMI port labeled "HDMI."

    e. Connect an HDMI cable from the 882 HDMI Tx 1 port to the HDMI input of the display device (used to monitor the video).

    The following diagram depicts the test setup for the 882EA:

2. Activate the HDMI-H interface on the output port as follows:

a. Press the **Interface** key. A listing of signal interfaces appears on the generator's display as shown below.

```
* VGA                    CVBS
  HDMI-D          S-VIDEO
  HDMI-H                  SDI
```

b. Choose the **HDMI-H** item by pressing the adjacent soft key. The interface is activated and the display is shown below.

```
  VGA                    CVBS
  HDMI-D          S-VIDEO
 *HDMI-H                  SDI
```

Alternatively, to activate the interface through the command line interface, enter the following commands:

```
XVSI 4          // Activates the HDMI-H interface
ALLU            // Applies the interface setting to the generator
```

3. Press the **Interface** key repeatedly until the following menu appears:

```
* HDMI IN 1
  HDMI IN 2
```

4. Choose the HDMI IN 1 by pressing the adjacent soft key.

5. Verify that the source is sending in video using the timing measurement function of the analzyer. Refer to "Measuring timing of video signal" on page 241 of the User Guide for information on running the timing test.

Verify that the source is outputting the 640x480p at 59.94/60Hz format (DMT0660):

If the 882 cannot detect the incoming video enter the following command to turn on the EST:

```
QD:PROD:EST        // Turns on the EST.
```
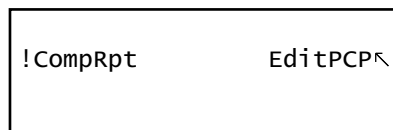
6. Press the **Tools** key and choose the **Reports** item by pressing the adjacent soft key.

The following is displayed on the generator's LCD.
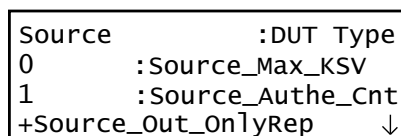
```
▯EDID           Packets▯
▯Misc              HDCP▯
```

7. Select **HDCP** to access the HDCP compliance test menu.

   The following is displayed on the generator's LCD.

   ```
   !CompRpt          EditPCP↖
   ```

8. Select **EditPCP** to define the capabilities of the HDCP device under test.

   The following is displayed on the generator's LCD.

   ```
   Source          :DUT Type
   0       :Source_Max_KSV
   1       :Source_Authe_Cnt
   +Source_Out_OnlyRep    ↓
   ```

The following table describes the test parameters and their settings (gray = N/A).

Parameter	Explanation
DUT type	Specifies the type of device under test. This can be one of Sink, Source, Repeater, Repeater3AB, or Repeater3C. For this test, select Source.
Source Max KSV	Specifies the maximum number of KSVs the source can read. The valid values are 1 through 127.
Source Authentication Control	Specifies the number of times a source DUT attempts authentication before transitioning into the authentication state. The valid values are 1 or greater.
Source Out Only Repeater	Indicates whether the DUT outputs contents to a repeater to which no downstream device is connected. The values are + for yes and - for no.
Sink 1.1 Features Supported	Indicates whether the DUT supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Sink 1.1 Audio Supported	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater 1.1 Features Supported	Indicates whether supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Repeater Audio Support	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater HPD Pulse	Indicates whether the DUT has the capability to output HPD pulse by user operation. The values are + for yes and - for no.

Parameter	Explanation
Repeater Max KSV	Specifies the maximum number of KSVs the repeater can read. The valid values are 2 through 127.
Repeater Out OnlyRep	Indicates whether the DUT outputs content to the downstream repeater that has no downstream device connected. The values are + for yes and - for no.

10. Select **Source** device by pressing the adjacent soft key to specify that the device under test is a source.

    Alternatively, you can specify the device under test as a source using the following commands:

    ```
    CPTX:DUTT 1      // specifies the device under test as a source.
    ```
    You can query the current value of the parameter with:

    ```
    CPTX:DUTT?       // returns the device under test type.
    ```

11. (Optional) Specify the remaining parameters in the **EditPCP** menu using the table above.

    Alternatively, you can specify the parameters through the command line as follows:

    ```
    CPTX:SKSV 10     // specifies maximum number of downstream devices
                        listed in the KSV list of the device under test.
                        Valid values are 1-127.
    CPTX:SRAC 5      // specifies number of times a source DUT attempts
                        authentication before transitioning into the
                        authenticated state. Valid values, 1 or greater.
    CPTX:SOOR 1      // Indicates whether DUT (source) outputs contents
                        to repeater with no downstream devices.
                        1 = yes; 0 = no.
    CPTX:SDCZ 0      // indicates whether the 882 should use a downstream
                        device count of 0 or the device count as specified
                        by the SKSV command (Source Max KSV).
                        Note 1: This parameter is only used for the
                        1B-01 test and this test should be run for both
                        settings: 0 or 1 (use setting of SKSV).
                        Note 2: The 882E starting in release 2.17.x will
                        run these two iterations of the test automatically
                        in batch mode.
    ```

12. Press the **Options** key to save the capabilities definition.

    The generator LCD will display the message "Saved".

13. Press the **Tools** key get back to the Reports menu.

    The generator LCD will display the reports menu as shown below.

    ```
    ⬚EDID         Packets⬚
    ⬚Misc            HDCP⬚
    ```

14. Select **HDCP** to access the HDCP compliance test menu.

   The following is displayed on the generator's LCD.

```
┌─────────────────────────────────┐
│                                 │
│  !CompRpt        EditPCP↖       │
│                                 │
│                                 │
└─────────────────────────────────┘
```

15. Select **!CompRpt** to initiate the HDCP compliance test.

   The message "HDCP Compliance Test" is shown and then all the tests are shown in sequence.

   Refer to "" on page 42 for procedures on how to view the generated report.

   Alternatively, you can run the tests using the following command:

```
CPTX:CPTR 46     // specifies that all applicable tests will be run.
CPTX:CPTU        // Initiates the execution of the test
```

16. Monitor the LCD for a set of prompts during the 1A-01, 1A-09, and 1B-01 tests. When prompted with the screen shown below, examine the video on the display under test and press the appropriate button adjacent to the indication (Yes! or No!) to continue.

   Note: *The prompt asks you if the video appearing on the connected display looks good. "Looks good" means that there is a picture and an absence of excessive snow.*

```
┌─────────────────────────────────┐
│     Does the video look         │
│          good?                  │
│                                 │
│  !Yes              No!          │
└─────────────────────────────────┘
```

17. (Optional) To run a specific test with the generator as **sink** (1A tests), you can use the command line as shown below:

```
CPTX:CPTR 1      // Selects specific test (e.g. 1A_01) see table below
CPTX:CPTU        // Initiates the execution of the test.
```

   You can query the complete list of tests to choose from:

```
CPTX:GCTN?       // Queries the list of tests supported
```

   You can query the currently selected test to run with:

```
CPTX:CPTR?       // Queries the selected test to run (see table)
```

18. (Optional) To run a specific test with the generator as **repeater** (1B tests), you can use the command line as shown below:

```
CPTX:CPTR 10     // Selects specific test (e.g. 1B_01) see table below
CPTX:CPTU        // Initiates the execution of the test.
```

   You can query the complete list of tests to choose from:

```
CPTX:GCTN?        // Queries the list of tests supported
```

You can query the currently selected test to run with:

```
CPTX:CPTR?        // Queries the selected test to run (see table)
```

The following table describes the tests that can be performed.

CPTX:CPTR

Index	Test	Description
1	1A_01 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Regular Procedure: With HDMI Capable Receiver
2	1A_02 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Regular Procedure: HPD After Writing Aksv
3	1A_03 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Regular Procedure: HPD After Starting Third Part of Authentication
4	1A_04 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (First Part of Authentication) HDPC Port Access
5	1A_05 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (First Part of Authentication) Verify Bksv
6	1A_06 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (First Part of Authentication) Verify R0'
7	1A_07 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: (Third Part of Authentication) Verify Ri'
8	1A_08 (Transmitter Downstream w/Receiver) w/HDMI Capable Receiver	Irregular Procedure: SRM. Requires SRM disc.
9	1A_09 (Transmitter Downstream w/Receiver) w/DVI Receiver	Regular Procedure: With DVI Receiver
10	1B_01 (Transmitter Downstream w/Repeater)	Regular Procedure: With Repeater
11	1B_02 (Transmitter Downstream w/Repeater)	Regular Procedure: HPD After Reading R0'
12	1B_03 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Timeout of KSV List READY
13	1B_04 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Verify V'

CPTX:CPTR

Index	Test	Description
14	1B_05 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_DEVS EXCEEDED
15	1B_06 (Transmitter Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_CASCADE EXCEEDED

To run the 1A-08 HDCP compliance test using the SRM disc:

1. Set up the test as described in "To run the 1A and 1B series HDCP compliance tests on an HDMI source (transmitter):" on page 7 using the instructions for the 882E analyzer.

   Note: The SRM test is only supported on the 882E analyzer. You can insert the SRM disc into the source device and run the HDCP tests in batch mode rather than through the command line.

2. Insert the SRM disc into the optical drive.

   Note: The SRM test does not apply for source devices that cannot play a DVD.

3. To run 1A-08 test, use the command line as shown below:

```
CPTX:DUTT 1      // Selects the device type as a source.
CPTX:CPTR 8      // Selects specific test (e.g. 1A_08).
CPTX:CPTU        // Initiates the execution of the test.
```

   Refer to "To view the HDCP compliance report:" on page 42 for procedures on how to view the generated report.

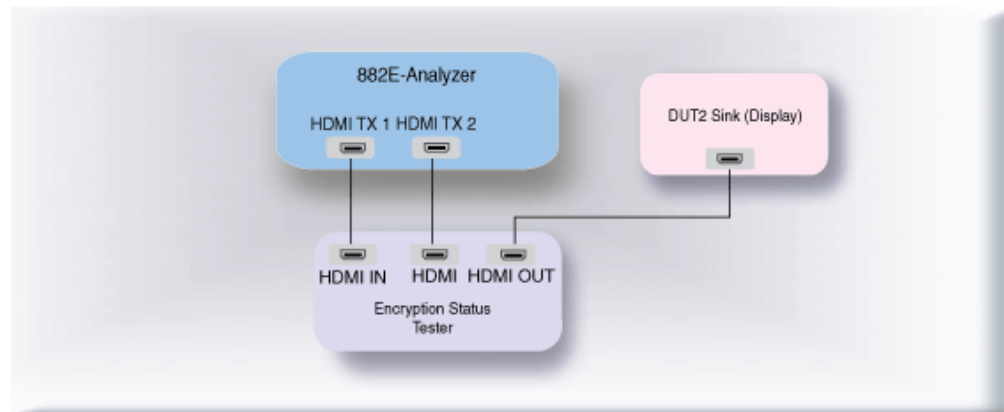# Running HDCP compliance tests on HDMI receivers

For the 882E the 2C-01 and 2C-04 tests are run multiple times for various settings. The 2C-01 test is required to be run in two configurations: 1) combined reads and 2) short reads. The 2C-04 test is required to be run in six (6) configurations. There are two read configurations: 1) short read and 2) combined read and there are three encryption pulse configurations: 1) in the beginning of the vertical blanking; 2) in the middle of the vertical blanking and 3) at the end of the vertical blanking.

These multiple iterations are handled in the batch mode but you can choose to run them through the command line as well.

To run the 2C series HDCP compliance test on an HDMI sink (receiver):

1. Connect the cables as follows:

   a. Apply power to the Encryption Status Tester (EST) using the power adapter that is supplied with the EST.

   b. Connect an HDMI cable from the sink device under test input to the EST HDMI port labeled, "HDMI OUT."

   c. Connect an HDMI cable from the 882 HDMI Tx 1 port to the EST HDMI port labeled "HDMI IN."

   d. Connect an HDMI cable from the 882 HDMI Tx 2 port to the EST HDMI port labeled "HDMI."

   The following diagram depicts the test setup:

2. Activate the HDMI-H interface on the output port as follows:

   a. Press the **Interface** key. A listing of signal interfaces appears on the generator's display as shown below.

   ```
   * VGA                    CVBS
     HDMI-D         S-VIDEO
     HDMI-H                  SDI
   ```

   b. Choose the **HDMI-H** item by pressing the adjacent soft key. The interface is activated and the display is shown below.

   ```
     VGA                    CVBS
     HDMI-D         S-VIDEO
   *HDMI-H                  SDI
   ```

   Alternatively, to activate the interface through the command line interface, enter the following commands:

   ```
   XVSI 4          // Activates the HDMI-H interface
   ALLU            // Applies the interface setting to the generator
   ```

3. Press the **Tools** key and choose the **Reports** item by pressing the adjacent soft key.

   The following is displayed on the generator's LCD.

   ```
   ▯EDID          Packets▯
   ▯Misc             HDCP ▯
   ```

4. Select **HDCP** to access the HDCP compliance test menu.

   The following is displayed on the generator's LCD.

   ```
   !CompRpt        EditPCP↖
   ```

5. Select **EditPCP** to define the capabilities of the HDCP device under.

   The following is displayed on the generator's LCD.

   ```
   Source           :DUT Type
   0        :Source_Max_KSV
   1        :Source_Authe_Cnt
   +Source_Out_OnlyRep    ↓
   ```

The following table describes the test parameters and their settings (gray = N/A).

Parameter	Explanation
DUT type	The type of device under test. This can be one of Sink, Source, Repeater, Repeater3AB, or Repeater3C. For this test, select Sink.
Source Max KSV	Specifies the maximum number of KSVs the source can read. The valid values are 1 through 127.
Source Authentication Control	Specifies the number of times a source DUT attempts authentication before transitioning into the authentication state. The valid values are 1 or greater.
Source Out Only Repeater	Indicates whether the DUT outputs contents to a repeater to which no downstream device is connected. The values are + for yes and - for no.
Sink 1.1 Features Supported	Indicates whether the DUT supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Sink 1.1 Audio Supported	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater 1.1 Features Supported	Indicates whether supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Repeater Audio Support	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater HPD Pulse	Indicates whether the DUT has the capability to output HPD pulse by user operation. The values are + for yes and - for no.
Repeater Max KSV	Specifies the maximum number of KSVs the repeater can read. The valid values are 2 through 127.
Repeater Out OnlyRep	Indicates whether the DUT outputs content to the downstream repeater that has no downstream device connected. The values are + for yes and - for no.

7. Select **Sink** device by pressing the adjacent soft key to specify that the device under test is a sink.

   The following is displayed on the generator's LCD.

   ```
   Sink           :DUT Type
   0       :Source_Max_KSV
   1       :Source_Authe_Cnt
   +Source_Out_OnlyRep    ↓
   ```

   Alternatively, you can specify the device under test as a sink using the following commands:

```
CPTX:DUTT 0      // specifies the device under test as a sink.
```

You can query the current value of the parameter with:

```
CPTX:DUTT?       // returns the device under test type.
```

8. (Optional) Specify the remaining parameters in the **EditPCP** menu using the table above.

Alternatively, you can specify the parameters through the command line as follows:

```
CPTX:SRFT 0      // indicates whether DUT (sink) supports 1.1
                    features such as Advanced Cipher and Enhanced
                    Link Verification. 1 = yes; 0 = no.
```

9. Press the **Options** key to save the capabilities definition.

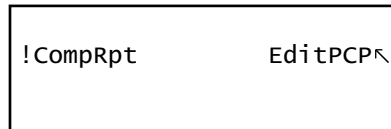The generator LCD will display the message "Saved".

10. Press the **Tools** key get back to the Reports menu.

The generator LCD will display the reports menu as shown below.

```
┌──────────────────────────┐
│ ▯EDID        Packets▯    │
│ ▯Misc           HDCP▯    │
│                          │
│                          │
└──────────────────────────┘
```

11. Select **HDCP** to access the HDCP compliance test menu.

The following is displayed on the generator's LCD.

```
┌──────────────────────────┐
│ !CompRpt      EditPCP↖   │
│                          │
│                          │
│                          │
└──────────────────────────┘
```

12. Select **!CompRpt** to initiate the HDCP compliance test.

The message "HDCP Compliance Test" is shown and then all the tests are shown in sequence.

Alternatively, you can run the tests using the following command:

```
CPTX:CPTR 46     // specifies that all applicable tests will be run.
CPTX:CPTU        // Initiates the execution of the test
```

Refer to "To view the HDCP compliance report:" on page 42 for procedures on how to view the generated report.

13. Monitor the 882E LCD for a set of prompts during the 2C-01 test.

    a. When prompted shown below occurs, power cycle the device under test:

    ```
    Please power cycle
          the DUT

                    Next!
    ```

    b. Press the button adjacent to the Next! indication after the device under test is back on to continue.

    c. When prompted with the screen shown below, examine the video on the display under test and press the appropriate button adjacent to the indication (Yes! or No!) to continue.

    Note: *The prompt asks you if the video appearing on the connected display looks good. "Looks good" means that there is a picture and an absence of excessive snow.*

    ```
    Does the video look
          good?

    !Yes              No!
    ```

14. (Optional) To run a specific test you can use the command line as shown below:

    ```
    CPTX:CPTR 16    // Selects specific test (e.g. 2C_01) see table below
    CPTX:CPTU       // Initiates the execution of the test
    ```

    You can query the complete list of tests to choose from:

    ```
    CPTX:GCTN?      // Queries the list of tests supported
    ```

    You can query the currently selected test to run with:

    ```
    CPTX:CPTR?      // Queries the selected test to run (see table)
    ```

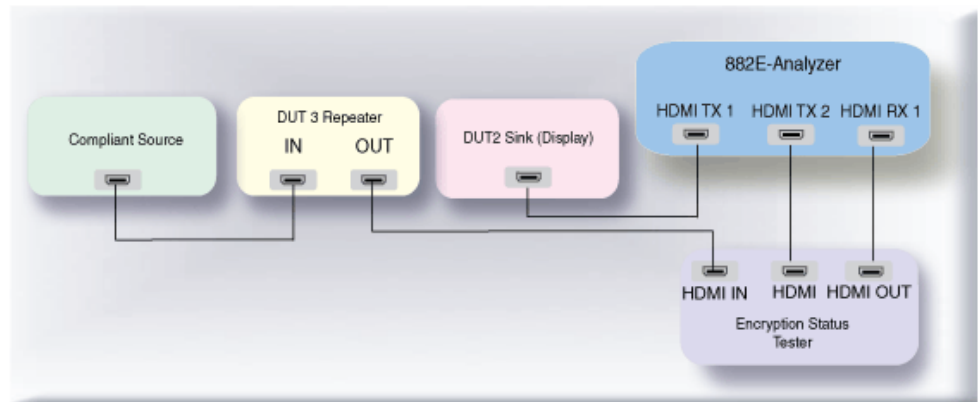The following table describes the tests that can be performed.

CPTX:CPTR

Index	Test	Description
16	2C_01 (Receiver Upstream w/Transmitter) (w/HDMI Capable Transmitter)	Regular Procedure: With HDMI Capable Transmitter
17	2C_02 (Receiver Upstream w/Transmitter) (w/HDMI Capable Transmitter)	Irregular Procedure: (First Part of Authentication) New Authentication
18	2C_03 (Receiver Upstream w/Transmitter) (w/HDMI Capable Transmitter)	Irregular Procedure: (Third Part of Authentication) New Authentication
19	2C_04 (Receiver Upstream w/Transmitter) (w/DVI Transmitter)	Regular Procedure: With DVI Transmitter

Running HDCP compliance tests on HDMI repeaters

To run the 3A series HDCP compliance tests on an HDMI repeater:

1. Connect the cables as follows:

   a. Apply power to the Encryption Status Tester (EST) using the power adapter supplied with the EST.

   b. Connect an HDMI cable from the repeater device under test output to the EST HDMI port labeled, "HDMI IN."

   c. Connect an HDMI cable from a compliant source device output to the input of the repeater device under test.

   d. Connect an HDMI cable from the 882 HDMI Rx 1 port to the EST HDMI port labeled "HDMI OUT."

   e. Connect an HDMI cable from the 882 HDMI Tx 2 port to the EST HDMI port labeled "HDMI."

   f. Connect an HDMI cable from the 882 HDMI Tx 1 port to the HDMI input of the display device (used to monitor the video).

   The following diagram depicts the test setup for the 882EA:

2. Activate the HDMI-H interface on the output port as follows:

    g. Press the **Interface** key. A listing of signal interfaces appears on the generator's display as shown below.

```
* VGA                    CVBS
  HDMI-D            S-VIDEO
  HDMI-H                 SDI
```

    h. Choose the **HDMI-H** item by pressing the adjacent soft key. The interface is activated and the display is shown below.

```
  VGA                    CVBS
  HDMI-D            S-VIDEO
 *HDMI-H                 SDI
```

Alternatively, to activate the interface through the command line interface, enter the following commands:

```
XVSI 4          // Activates the HDMI-H interface
ALLU            // Applies the interface setting to the generator
```

3. Press the **Interface** key repeatedly until the following menu appears:

```
* HDMI IN 1
  HDMI IN 2
```

4. Choose the HDMI IN 1 by pressing the adjacent soft key.

5. Verify that the repeater is sending in video using the Timing measurement function of the analzyer. Refer to "Measuring timing of video signal" on page 241 of the User Guide for information on running the timing test.

Verify that the source is outputting the 640x480p at 59.94/60Hz format (DMT0660):

If the 882 cannot detect the incoming video enter the following command to turn on the EST:

```
QD:PROD:EST          // Turns on the EST
```

6. Press the **Tools** key and choose the **Reports** item by pressing the adjacent soft key.

The following is displayed on the generator's LCD.

```
 EDID            Packets
 Misc               HDCP
```

7. Select **HDCP** to access the HDCP compliance test menu.

The following is displayed on the generator's LCD.

```
!CompRpt          EditPCP↖
```

8. Select **EditPCP** to define the capabilities of the HDCP device under.

The following is displayed on the generator's LCD.

```
Source          :DUT Type
0       :Source_Max_KSV
1       :Source_Authe_Cnt
+Source_Out_OnlyRep     ↓
```

The following table describes the test parameters and their settings (gray = N/A).

Parameter	Explanation
DUT type	The type of device under test. This can be one of Sink, Source, Repeater, Repeater3AB, or Repeater3C. For this test, select Repeater3AB.
Source Max KSV	Specifies the maximum number of KSVs the source can read. The valid values are 1 through 127.
Source Authentication Control	Specifies the number of times a source DUT attempts authentication before transitioning into the authentication state. The valid values are 1 or greater.
Source Out Only Repeater	Indicates whether the DUT outputs contents to a repeater to which no downstream device is connected. The values are + for yes and - for no.
Sink 1.1 Features Supported	Indicates whether the DUT supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Sink 1.1 Audio Supported	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater 1.1 Features Supported	Indicates whether supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Repeater Audio Support	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater HPD Pulse	Indicates whether the DUT has the capability to output HPD pulse by user operation. The values are + for yes, repeater DUT allows the user to initiate a HPD; and - for no, the repeater DUT does not support a user to manually force of a hot plug pulse.

Parameter	Explanation
Repeater Max KSV	Specifies the maximum number of KSVs the repeater can read. The valid values are 2 through 127.
Repeater Out OnlyRep	Indicates whether the DUT outputs content to the downstream repeater that has no downstream device connected. The values are + for yes, the repeater will forward encrypted video to a downstream repeater when there are no other downstream devices; and - for no, the repeater will not forward encrypted video to a downstream repeater when there are no other downstream devices.

10. Select **Repeater3AB** device by pressing the adjacent soft key to specify that the device under test is a repeater.

The following is displayed on the generator's LCD.

```
Repeater3AB     :DUT Type
0       :Source_Max_KSV
1       :Source_Authe_Cnt
+Source_Out_OnlyRep      ↓
```

Alternatively, you can specify the device under test as a repeater for the 3A test using the following commands:

```
CPTX:DUTT 3      // specifies the device under test as a repeater
                    for test 3AB.
```

You can query the current value of the parameter with:

```
CPTX:DUTT?       // returns the device under test type.
```

11. (Optional) Specify the remaining parameters in the **EditPCP** menu using the table above.

Alternatively, you can specify the parameters through the command line as follows:

```
CPTX:RPFT 0      // indicates whether DUT (repeater) supports 1.1
                    features such as Advanced Cipher and Enhanced
                    Link Verification. 1 = yes; 0 = no.
CPTX:RKSV 10     // specifies maximum number of downstream devices
                    that can be supported in the repeater's KSV list
CPTX:ROOR 0      // indicates whether DUT (repeater) outputs outputs
                    content to the downstream repeater that does not
                    have any downstream device connected.
                    1 = yes; 0 = no.
```

12. Press the **Options** key to save the capabilities definition.
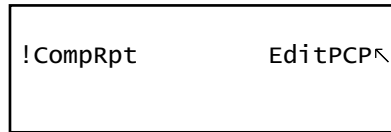
The generator LCD will display the message "Saved".

13. Press the **Tools** key get back to the Reports menu.

The generator LCD will display the message "Saved".

14. Select **HDCP** to access the HDCP compliance test menu.

    The following is displayed on the generator's LCD.

    ```
    !CompRpt          EditPCP↖
    ```

15. Select **!CompRpt** to initiate the HDCP compliance test.

    The message "HDCP Compliance Test" is shown and then all the tests are shown in sequence.

    Alternatively, you can run the tests using the following command:

    ```
    CPTX:CPTR 46      // specifies that all applicable tests will be run.
    CPTX:CPTU         // Initiates the execution of the test
    ```

    Refer to "To view the HDCP compliance report:" on page 42 for procedures on how to view the generated report.

16. Monitor the 882E LCD for a set of prompts during the 3A-01 and 3A-05 tests.

    a. When prompted shown below occurs, power cycle the device under test:
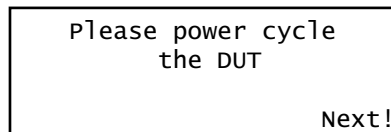
    ```
    Please power cycle
          the DUT

                    Next!
    ```

    b. Press the button adjacent to the Next! indication after the device under test is back on to continue.

    c. When prompted with the screen shown below, examine the video on the display under test and press the appropriate button adjacent to the indication (Yes! or No!) to continue.

    Note: *The prompt asks you if the video appearing on the connected display looks good. "Looks good" means that there is a picture and an absence of excessive snow.*

    ```
    Does the video look
          good?

    !Yes               No!
    ```
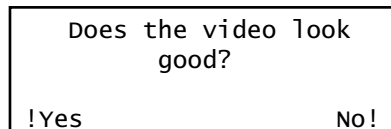
17. (Optional) To run a specific test you can use the command line as shown below:

    ```
    CPTX:CPTR 20      // Selects specific test (e.g. 3A_01) see table below
    CPTX:CPTU         // Initiates the execution of the test
    ```

    You can query the complete list of tests to choose from:

    ```
    CPTX:GCTN?        // Queries the list of tests supported
    ```

    You can query the currently selected test to run with:

```
CPTX:CPTU?        // Queries the selected test to run (see table)
```

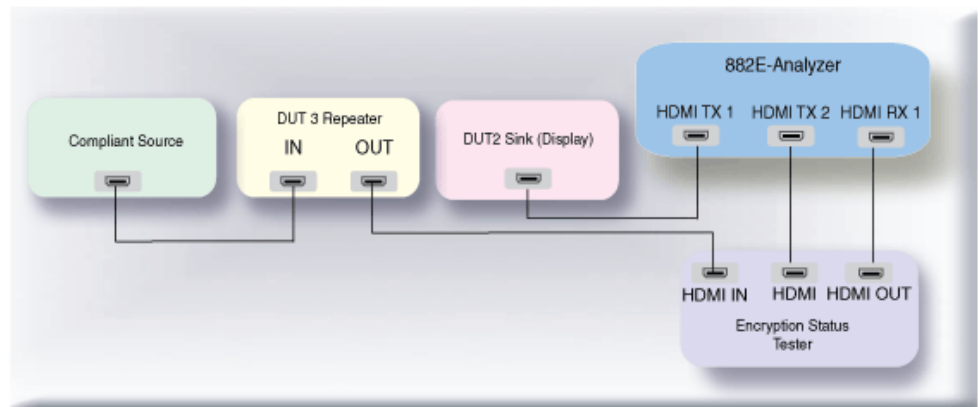The following table describes the tests that can be performed.

CPTX:CPTR

Index	Test	Description
20	3A_01 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Regular Procedure: With HDMI Capable Receiver
21	3A_02 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) HDCP Port Access
22	3A_03 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) Verify Bksv
23	3A_04 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) Verify RO'
24	3A_05 (Repeater Downstream w/Receiver) (Between HDMI Capable Transmitter and DVI Receiver)	Regular Procedure: With DVI Receiver

To run the 3B series HDCP compliance tests on an HDMI repeater:

The 3B-01 test is run multiple times for the two read configurations: 1) short read and 2) combined read. These multiple iterations are handled in the batch mode but you can choose to run them through the command line as well.

1. Connect the cables as follows:

   a. Apply power to the Encryption Status Tester (EST) using the power adapter supplied with the EST.

   b. Connect an HDMI cable from the repeater device under test output to the EST HDMI port labeled, "HDMI IN."

   c. Connect an HDMI cable from a compliant source device output to the input of the repeater device under test.

   d. Connect an HDMI cable from the 882 HDMI Rx 1 port to the EST HDMI port labeled "HDMI OUT."

   e. Connect an HDMI cable from the 882 HDMI Tx 2 port to the EST HDMI port labeled "HDMI."

   f. Connect an HDMI cable from the 882 HDMI Tx 1 port to the HDMI input of the display device (used to monitor the video).

   The following diagram depicts the test setup for the 882EA:

2. Activate the HDMI-H interface on the output port as follows:

a. Press the **Interface** key. A listing of signal interfaces appears on the generator's display as shown below.

```
* VGA              CVBS
  HDMI-D        S-VIDEO
  HDMI-H            SDI
```

b. Choose the **HDMI-H** item by pressing the adjacent soft key. The interface is activated and the display is shown below.

```
  VGA              CVBS
  HDMI-D        S-VIDEO
 *HDMI-H            SDI
```

Alternatively, to activate the interface through the command line interface, enter the following commands:

```
XVSI 4          // Activates the HDMI-H interface
ALLU            // Applies the interface setting to the generator
```

3. Press the **Interface** key repeatedly until the following menu appears:

```
* HDMI IN 1
  HDMI IN 2
```

4. Choose the HDMI IN 1 by pressing the adjacent soft key.

5. Verify that the repeater is sending in video using the Timing measurement function of the analzyer. Refer to "Measuring timing of video signal" on page 241 of the User Guide for information on running the timing test.

Verify that the source is outputting the 640x480p at 59.94/60Hz format (DMT0660):

If the 882 cannot detect the incoming video enter the following command to turn on the EST:

```
QD:PROD:EST          // Turns on the EST
```

6. Press the **Tools** key and choose the **Reports** item by pressing the adjacent soft key.

The following is displayed on the generator's LCD.

```
□EDID          Packets□
□Misc             HDCP□
```

7. Select **HDCP** to access the HDCP compliance test menu.

   The following is displayed on the generator's LCD.

```
!CompRpt          EditPCP↖
```

8. Select **EditPCP** to define the capabilities of the HDCP device under.

   The following is displayed on the generator's LCD.

```
Source          :DUT Type
0       :Source_Max_KSV
1       :Source_Authe_Cnt
+Source_Out_OnlyRep    ↓
```

The following table describes the test parameters and their settings (gray = N/A).

Parameter	Explanation
DUT type	The type of device under test. This can be one of Sink, Source, Repeater, Repeater3AB, or Repeater3C. For this test, select Repeater3AB.
Source Max KSV	Specifies the maximum number of KSVs the source can read. The valid values are 1 through 127.
Source Authentication Control	Specifies the number of times a source DUT attempts authentication before transitioning into the authentication state. The valid values are 1 or greater.
Source Out Only Repeater	Indicates whether the DUT outputs contents to a repeater to which no downstream device is connected. The values are + for yes and - for no.
Sink 1.1 Features Supported	Indicates whether the DUT supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Sink 1.1 Audio Supported	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater 1.1 Features Supported	Indicates whether supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Repeater Audio Support	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater HPD Pulse	Indicates whether the DUT has the capability to output HPD pulse by user operation. The values are + for yes, repeater DUT allows the user to initiate a HPD; and - for no, the repeater DUT does not support a user to manually force of a hot plug pulse.

Parameter	Explanation
Repeater Max KSV	Specifies the maximum number of KSVs the repeater can read. The valid values are 2 through 127.
Repeater Out OnlyRep	Indicates whether the DUT outputs content to the downstream repeater that has no downstream device connected. The values are + for yes, the repeater will forward encrypted video to a downstream repeater when there are no other downstream devices; and - for no, the repeater will not forward encrypted video to a downstream repeater when there are no other downstream devices.

10. Select **Repeater3AB** device by pressing the adjacent soft key to specify that the device under test is a repeater.

    The following is displayed on the generator's LCD.

    ```
    Repeater3AB     :DUT Type
    0        :Source_Max_KSV
    1        :Source_Authe_Cnt
    +Source_Out_OnlyRep    ↓
    ```

    Alternatively, you can specify the device under test as a repeater for the 3B test using the following commands:

    ```
    CPTX:DUTT 3      // specifies the device under test as a repeater
                        for test 3AB.
    ```

    You can query the current value of the parameter with:

    ```
    CPTX:DUTT?       // returns the device under test type.
    ```

11. (Optional) Specify the remaining parameters in the **EditPCP** menu using the table above.

    Alternatively, you can specify the parameters through the command line as follows:
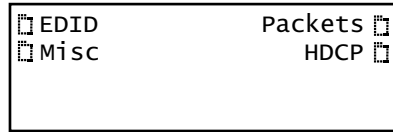
    ```
    CPTX:RPFT 0      // indicates whether DUT (repeater) supports 1.1
                        features such as Advanced Cipher and Enhanced
                        Link Verification. 1 = yes; 0 = no.
    CPTX:RKSV 10     // specifies maximum number of downstream devices
                        that can be supported in the repeater's KSV list
    CPTX:ROOR 0      // indicates whether DUT (repeater) outputs outputs
                        content to the downstream repeater that does not
                        have any downstream device connected.
                        1 = yes; 0 = no.
    CPTX:SRCZ 0      // indicates whether the 880 should use a downstream
                        device count of 0 or the device count as specified
                        by the SKSV command.
                        Note that this parameter is only used for the
                        3B-01 test and this test should be run for both
                        settings: 0 or 1 (use setting of SKSV).
    ```

12. Press the **Options** key to save the capabilities definition.

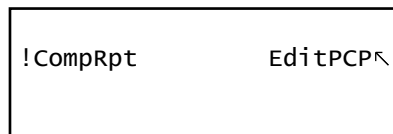   The generator LCD will display the message "Saved".

13. Press the **Tools** key get back to the Reports menu.

    The generator LCD will display the reports menu as shown below.

```
┌─────────────────────────┐
│❏EDID        Packets❏    │
│❏Misc           HDCP❏    │
│                         │
│                         │
└─────────────────────────┘
```

14. Select **HDCP** to access the HDCP compliance test menu.

    The following is displayed on the generator's LCD.

```
┌─────────────────────────┐
│                         │
│!CompRpt      EditPCP↖    │
│                         │
│                         │
└─────────────────────────┘
```

15. Select **!CompRpt** to initiate the HDCP compliance test.

    The message "HDCP Compliance Test" is shown and then all the tests are shown in sequence.
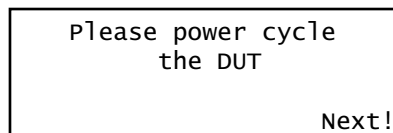
    Alternatively, you can run the tests using the following command:

```
CPTX:CPTR 46     // specifies that all applicable tests will be run.
CPTX:CPTU        // Initiates the execution of the test
```

    Refer to "To view the HDCP compliance report:" on page 42 for procedures on how to view the generated report.

16. Monitor the 882E LCD for a set of prompts during the 3B-01 test.

    a. When prompted shown below occurs, power cycle the device under test:

```
┌─────────────────────────┐
│  Please power cycle     │
│       the DUT           │
│                         │
│                Next!    │
└─────────────────────────┘
```

    b. Press the button adjacent to the Next! indication after the device under test is back on to continue.

    c. When prompted with the screen shown below, examine the video on the display under test and press the appropriate button adjacent to the indication (Yes! or No!) to continue.

Note: The prompt asks you if the video appearing on the connected display looks good. "Looks good" means that there is a picture and an absence of excessive snow.

```
   Does the video look
         good?

!Yes                No!
```

17. (Optional) To run a specific test you can use the command line as shown below:

```
CPTX:CPTR 25    // Selects specific test (e.g. 3B_01) see table below
CPTX:CPTU       // Initiates the execution of the test
```

You can query the complete list of tests to choose from:

```
CPTX:GCTN?      // Queries the list of tests supported
```

You can query the currently selected test to run with:

```
CPTX:CPTR?      // Queries the selected test to run (see table)
```

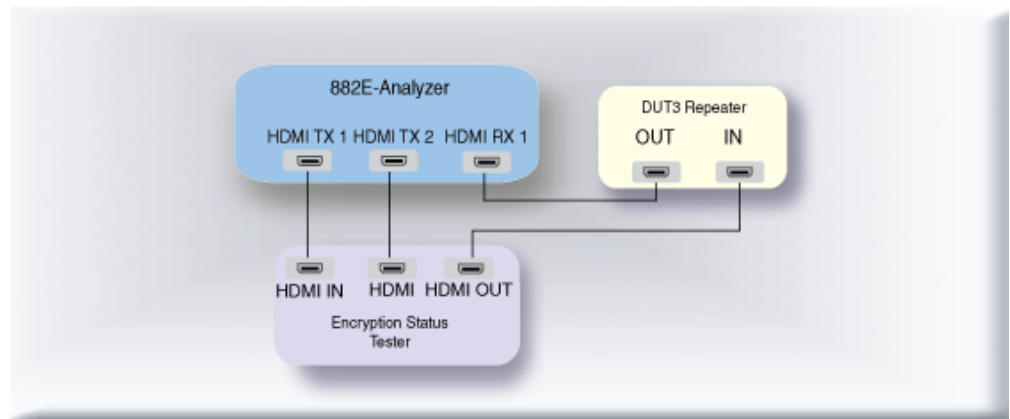The following table describes the tests that can be performed.

CPTX:CPTR

Index	Test	Description
25	3B_01 (Repeater Downstream w/Repeater)	Regular Procedure: With Repeater
26	3B_02 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Timeout of KSV List READY
27	3B_03 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) Verify V'
28	3B_04 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_DEVS_EXCEEDED
29	3B_05 (Repeater Downstream w/Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_CASCADE_EXCEEDED

To run the 3C-I series HDCP compliance tests on an HDMI repeater:

The 3C-I-01 test is run for each of the two read configurations: 1) short read and 2) combined read. These multiple iterations are handled in the batch mode but you can choose to run them through the command line as well.

1. Connect the cables as follows:

    a. Apply power to the Encryption Status Tester (EST) using the power adapter supplied with the EST.

    b. Connect an HDMI cable from the repeater device under test input to the EST HDMI port labeled, "HDMI OUT."

    c. Connect an HDMI cable from the 882 HDMI Rx 1 port to the HDMI output of the repeater device under test.

    d. Connect an HDMI cable from the 882 HDMI Tx 1 port to the EST HDMI port labeled "HDMI IN."

    e. Connect an HDMI cable from the 882 HDMI Tx 2 port to the EST HDMI port labeled "HDMI."

    The following diagram depicts the test setup for the 882EA:

2. Activate the HDMI-H interface on the output port as follows:

    a. Press the **Interface** key. A listing of signal interfaces appears on the generator's display as shown below.

    ```
    * VGA                    CVBS
      HDMI-D              S-VIDEO
      HDMI-H                  SDI
    ```

    b. Choose the **HDMI-H** item by pressing the adjacent soft key. The interface is activated and the display is shown below.

    ```
      VGA                    CVBS
      HDMI-D              S-VIDEO
    *HDMI-H                  SDI
    ```

    Alternatively, to activate the interface through the command line interface, enter the following commands:

```
XVSI 4          // Activates the HDMI-H interface
ALLU            // Applies the interface setting to the generator
```

3. Press the **Interface** key repeatedly until the following menu appears:

```
*HDMI IN 1
 HDMI IN 2
```

4. Choose the HDMI IN 1 by pressing the adjacent soft key.

5. For the 882E when using the EST, verify that the source is sending in video using the timing measurement function of the analzyer. Refer to "Measuring timing of video signal" on page 241 of the User Guide for information on running the timing test.

   Verify that the source is outputting the 640x480p at 59.94/60Hz format (DMT0660):

   If the 882 cannot detect the incoming video enter the following command to turn on the EST:

```
QD:PROD:EST          // Turns on the EST.
```

6. Press the **Tools** key and choose the **Reports** item by pressing the adjacent soft key.

   The following is displayed on the generator's LCD.

```
▯EDID          Packets▯
▯Misc             HDCP▯
```

7. Select **HDCP** to access the HDCP compliance test menu.

   The following is displayed on the generator's LCD.

```
!CompRpt        EditPCP↖
```

8. Select **EditPCP** to define the capabilities of the HDCP device under.

   The following is displayed on the generator's LCD.

```
Source          :DUT Type
0        :Source_Max_KSV
1        :Source_Authe_Cnt
+Source_Out_OnlyRep     ↓
```

The following table describes the test parameters and their settings (gray = N/A).

Parameter	Explanation
DUT type	The type of device under test. This can be one of Sink, Source, Repeater, Repeater3AB, or Repeater3C. For this test, select Repeater3C.
Source Max KSV	Specifies the maximum number of KSVs the source can read. The valid values are 1 through 127.
Source Authentication Control	Specifies the number of times a source DUT attempts authentication before transitioning into the authentication state. The valid values are 1 or greater.
Source Out Only Repeater	Indicates whether the DUT outputs contents to a repeater to which no downstream device is connected. The values are + for yes and - for no.
Sink 1.1 Features Supported	Indicates whether the DUT supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Sink 1.1 Audio Supported	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater 1.1 Features Supported	Indicates whether supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Repeater Audio Support	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater HPD Pulse	Indicates whether the DUT has the capability to output HPD pulse by user operation. The values are + for yes, repeater DUT allows the user to initiate a HPD; and - for no, the repeater DUT does not support a user to manually force of a hot plug pulse.
Repeater Max KSV	Specifies the maximum number of KSVs the repeater can read. The valid values are 2 through 127.
Repeater Out OnlyRep	Indicates whether the DUT outputs content to the downstream repeater that has no downstream device connected. The values are + for yes, the repeater will forward encrypted video to a downstream repeater when there are no other downstream devices; and - for no, the repeater will not forward encrypted video to a downstream repeater when there are no other downstream devices.

9. Select **Repeater3C** device by pressing the adjacent soft key to specify that the device under test is a repeater.

The following is displayed on the generator's LCD.

```
Repeater3C       :DUT Type
0        :Source_Max_KSV
1        :Source_Authe_Cnt
+Source_Out_OnlyRep     ↓
```

Alternatively, you can specify the device under test as a repeater for the 3C test using the following commands:

```
CPTX:DUTT 4     // specifies the device under test as a repeater
                   for the 3C test.
```

You can query the current value of the parameter with:

```
CPTX:DUTT?      // returns the device under test type.
```

10. (Optional) Specify the remaining parameters in the **EditPCP** menu using the table above.

Alternatively, you can specify the parameters through the command line as follows:

```
CPTX:RPFT 0     // indicates whether DUT (repeater) supports 1.1
                   features such as Advanced Cipher and Enhanced
                   Link Verification. 1 = yes; 0 = no.
CPTX:RKSV 10    // specifies maximum number of downstream devices
                   that can be supported in the repeater's KSV list
CPTX:ROOR 0     // indicates whether DUT (repeater) outputs outputs
                   content to the downstream repeater that does not
                   have any downstream device connected.
                   1 = yes; 0 = no.
```

11. Press the **Options** key to save the capabilities definition.

The generator LCD will display the message "Saved".

12. Press the **Tools** key get back to the Reports menu.

The generator LCD will display the reports menu as shown below.

```
▯EDID            Packets▯
▯Misc               HDCP▯
```

13. Select **HDCP** to access the HDCP compliance test menu.

The following is displayed on the generator's LCD.

```
!CompRpt        EditPCP↖
```

14. Select **!CompRpt** to initiate the HDCP compliance test.

    The message "HDCP Compliance Test" is shown and then all the tests are shown in sequence.

    Alternatively, you can run the tests using the following command:

    ```
    CPTX:CPTR 46     // specifies that all applicable tests will be run.
    CPTX:CPTU        // Initiates the execution of the test
    ```

    Refer to "To view the HDCP compliance report:" on page 42 for procedures on how to view the generated report.

15. (Optional) To run a specific test you can use the command line as shown below:

    ```
    CPTX:CPTR 30     // Selects specific test (e.g. 3C1_01) see
                        table below
    CPTX:CPTU        // Initiates the execution of the test
    ```

    You can query the complete list of tests to choose from:

    ```
    CPTX:GCTN?       // Queries the list of tests supported
    ```

    You can query the currently selected test to run with:

    ```
    CPTX:CPTR?       // Queries the selected test to run (see table)
    ```

The following table describes the tests that can be performed.

CPTX:CPTR

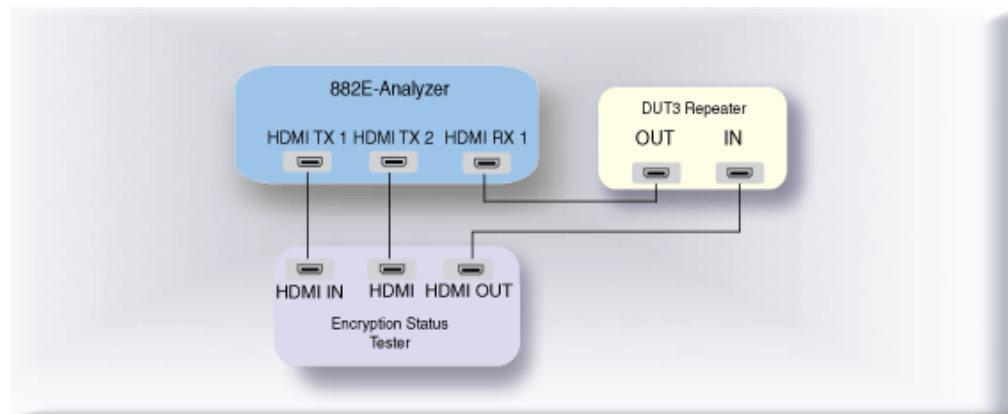| Index	Test	Description
30	3C_I_01 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Regular Procedure: Transmitter – DUT – Receiver
31	3C_I_02 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Regular Procedure: HPD Pulse Output Caused By User Operation
32	3C_I_03 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (First Part of Authentication) New Authentication
33	3C_I_04 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Second Part of Authentication) New Authentication
34	3C_I_05 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Third Part of Authentication) New Authentication

Index	Test	Description
35	3C_I_06 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Second Part of Authentication) Verify Bksv
36	3C_I_07 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and HDMI Capable Receiver)	Irregular Procedure: (Second Part of Authentication) Verify R0'

To run the 3C-II series HDCP compliance tests on an HDMI repeater:

The 3C-II-01 test is run for each of the two read configurations: 1) short read and 2) combined read. These multiple iterations are handled in the batch mode but you can choose to run them through the command line as well.

1. Connect the cables as follows:

    a. Apply power to the Encryption Status Tester (EST) using the power adapter supplied with the EST.

    b. Connect an HDMI cable from the repeater device under test input to the EST HDMI port labeled, "HDMI OUT."

    c. Connect an HDMI cable from the 882 HDMI Rx 1 port to the HDMI output of the repeater device under test.

    d. Connect an HDMI cable from the 882 HDMI Tx 1 port to the EST HDMI port labeled "HDMI IN."

    e. Connect an HDMI cable from the 882 HDMI Tx 2 port to the EST HDMI port labeled "HDMI."

    The following diagram depicts the test setup for the 882EA:

2. Activate the HDMI-H interface on the output port as follows:

    a. Press the **Interface** key. A listing of signal interfaces appears on the generator's display as shown below.

    ```
    * VGA                CVBS
      HDMI-D          S-VIDEO
      HDMI-H              SDI
    ```

    b. Choose the **HDMI-H** item by pressing the adjacent soft key. The interface is activated and the display is shown below.

    ```
      VGA                CVBS
      HDMI-D          S-VIDEO
    * HDMI-H              SDI
    ```

    Alternatively, to activate the interface through the command line interface, enter the following commands:

    ```
    XVSI 4          // Activates the HDMI-H interface
    ALLU            // Applies the interface setting to the generator
    ```

3. Press the **Interface** key repeatedly until the following menu appears:

    ```
    * HDMI IN 1
      HDMI IN 2
    ```

4. Choose the HDMI IN 1 by pressing the adjacent soft key.

5. For the 882E when using the EST, verify that the source is sending in video using the timing measurement function of the analzyer. Refer to "Measuring timing of video signal" on page 241 of the User Guide for information on running the timing test.

    Verify that the source is outputting the 640x480p at 59.94/60Hz format (DMT0660):

6. If the 882 cannot detect the incoming video enter the following command to turn on the EST:

    ```
    QD:PROD:EST        // Turns on the EST.
    ```

7. Press the **Tools** key and choose the **Reports** item by pressing the adjacent soft key.

    The following is displayed on the generator's LCD.

    ```
    □ EDID          Packets □
    □ Misc             HDCP □
    ```

8. Select **HDCP** to access the HDCP compliance test menu.

   The following is displayed on the generator's LCD.

```
!CompRpt          EditPCP↖
```

9. Select **EditPCP** to define the capabilities of the HDCP device under.

   The following is displayed on the generator's LCD.

```
Source          :DUT Type
0        :Source_Max_KSV
1        :Source_Authe_Cnt
+Source_Out_OnlyRep     ↓
```

The following table describes the test parameters and their settings (gray = N/A).

Parameter	Explanation
DUT type	The type of device under test. This can be one of Sink, Source, Repeater, Repeater3AB, or Repeater3C. For this test, select Repeater3C.
Source Max KSV	Specifies the maximum number of KSVs the source can read. The valid values are 1 through 127.
Source Authentication Control	Specifies the number of times a source DUT attempts authentication before transitioning into the authentication state. The valid values are 1 or greater.
Source Out Only Repeater	Indicates whether the DUT outputs contents to a repeater to which no downstream device is connected. The values are + for yes and - for no.
Sink 1.1 Features Supported	Indicates whether the DUT supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Sink 1.1 Audio Supported	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater 1.1 Features Supported	Indicates whether supports Advanced_Cipher mode and Enhanced Link Verification. The values are + for yes and - for no.
Repeater Audio Support	Indicates whether the DUT supports audio output. The values are + for yes and - for no.
Repeater HPD Pulse	Indicates whether the DUT has the capability to output HPD pulse by user operation. The values are + for yes, repeater DUT allows the user to initiate a HPD; and - for no, the repeater DUT does not support a user to manually force of a hot plug pulse.

Parameter	Explanation
Repeater Max KSV	Specifies the maximum number of KSVs the repeater can read. The valid values are 2 through 127.
Repeater Out OnlyRep	Indicates whether the DUT outputs content to the downstream repeater that has no downstream device connected. The values are + for yes, the repeater will forward encrypted video to a downstream repeater when there are no other downstream devices; and - for no, the repeater will not forward encrypted video to a downstream repeater when there are no other downstream devices.

9. Select **Repeater3C** device by pressing the adjacent soft key to specify that the device under test is a repeater.

   The following is displayed on the generator's LCD.

   ```
   Repeater3C      :DUT Type
   0        :Source_Max_KSV
   1        :Source_Authe_Cnt
   +Source_Out_OnlyRep     ↓
   ```

   Alternatively, you can specify the device under test as a repeater using the following commands:

   ```
   CPTX:DUTT 4     // specifies the device under test as a repeater.
   ```

   You can query the current value of the parameter with:

   ```
   CPTX:DUTT?      // returns the device under test type.
   ```

10. (Optional) Specify the remaining parameters in the **EditPCP** menu using the table above.

    Alternatively, you can specify the parameters through the command line as follows:

    ```
    CPTX:RPFT 0      // indicates whether DUT (repeater) supports 1.1
                        features such as Advanced Cipher and Enhanced
                        Link Verification. 1 = yes; 0 = no.
    CPTX:RKSV 10     // specifies maximum number of downstream devices
                        that can be supported in the repeater's KSV list
    CPTX:ROOR 0      // indicates whether DUT (repeater) outputs outputs
                        content to the downstream repeater that does not
                        have any downstream device connected.
                        1 = yes; 0 = no.
    ```

11. Press the **Options** key to save the capabilities definition.
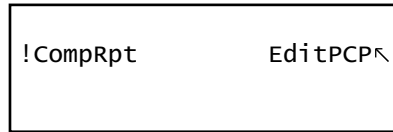
    The generator LCD will display the message "Saved".

12. Press the **Tools** key get back to the Reports menu.

    The generator LCD will display the reports menu as shown below.

```
┌─────────────────────────┐
│ EDID          Packets   │
│ Misc             HDCP    │
│                         │
└─────────────────────────┘
```

13. Select **HDCP** to access the HDCP compliance test menu.

    The following is displayed on the generator's LCD.

```
┌─────────────────────────┐
│                         │
│ !CompRpt      EditPCP↖   │
│                         │
└─────────────────────────┘
```

14. Select **!CompRpt** to initiate the HDCP compliance test.

    The message "HDCP Compliance Test" is shown and then all the tests are shown in sequence.

    Alternatively, you can run the tests using the following command:

```
CPTX:CPTR 46     // specifies that all applicable tests will be run.
CPTX:CPTU        // Initiates the execution of the test
```

    Refer to "To view the HDCP compliance report:" on page 42 for procedures on how to view the generated report.

15. (Optional) To run a specific test you can use the command line as shown below:

```
CPTX:CPTR 37     // Selects specific test (e.g. 3C2_01) see table
                    below
CPTX:CPTU        // Initiates the execution of the test
```

    You can query the complete list of tests to choose from:

```
CPTX:GCTN?       // Queries the list of tests supported
```

    You can query the currently selected test to run with:

```
CPTX:CPTR?       // Queries the selected test to run (see table)
```

The following table describes the tests that can be performed.

CPTX:CPTR

Index	Test	Description
37	3C_II_01 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: Transmitter – DUT – Repeater-Receiver
38	3C_II_02 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: HPD After Writing Aksv

CPTX:CPTR

| Index	Test	Description
39	3C_II_03 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: HPD After Reading R0'
40	3C_II_04 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Regular Procedure: HPD After Starting Third Part of Authentication
41	3C_II_05 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) Verify V'
42	3C_II_06 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) DEVICE_COUNT
43	3C_II_07 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) DEPTH
44	3C_II_08 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_DEVS_EXCEEDED
45	3C_II_09 (Repeater Upstream w/Transmitter) (Between HDMI Capable Transmitter and Repeater)	Irregular Procedure: (Second Part of Authentication) MAX_CASCADE_EXCEEDED

To view the HDCP compliance report:

1. Open a Web browser (such as Internet Explorer) and type the generator's IP address in the address entry field. For example, enter the following: http://206.135.215.189/

   The generator home page appears in the browser.

Note: *You can add the page to your list of favorite pages in your Web browser to avoid retyping the IP address each time you want to access the page.*

2. Choose the **Generated Reports** item. The Generator the provides a list of reports currently available as shown below.
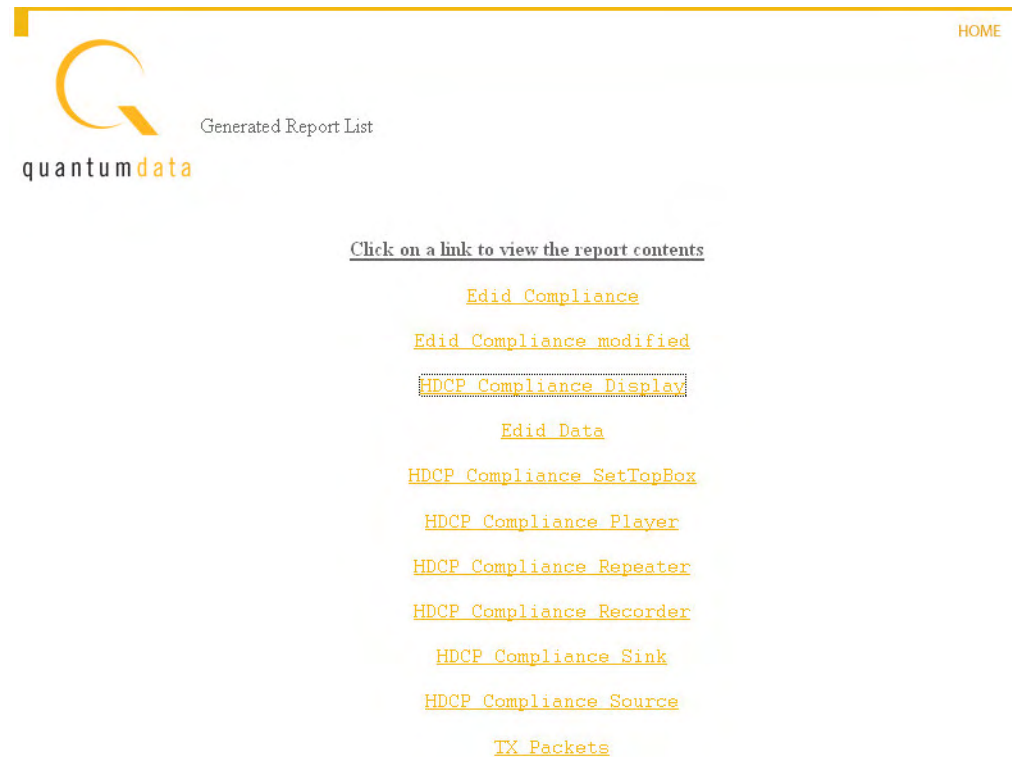
3. Select the HDCP compliance test report from the list. The report then appears in the browser window as shown below. You can then save the report as a web page file for distribution. The following is an example of a report for the HDCP compliance test for a display.

HDCP Compliance Report

quantumdata

Generator Information

Model = 882CA
Unit Revision = A
Unit SN = 6050019
Date = 05042006
Firmware = 20.1883502

Unit Under Test Information (PCP Selections)

Unit Under Test Type = Display
Source_Max_KSV = 0
Source_Authe_Count = 1
Source_Out_OnlyRep = YES
Sink_1.1Features_Supported = NO
Sink_Audio_Supported = YES
Repeater_1.1Features_Supported = YES
Repeater_Audio_Supported = YES
Repeater_HPD_Pulse = YES
Repeater_Max_KSV = 2
Repeater_Out_OnlyRep = YES

Repeater TESTS Summary (Test 3C1-3C11)

```
Test 3C-1-01: Regular Procedure Transmitter-DUT-Receiver.
Test 3C-1-02: Regular procedure:HPD pulse output caused by user operation
Test 3C-1-03: Irregular procedure.(First part of authentication) New authentication.
Test 3C-1-04: Irregular procedure:(Second part of authentication) New Authentication.
Test 3C-1-05: Irregular Procedure (Third part of authentication) New Authentication.
Test 3C-1-06: Irregular procedure:(Second part of authentication) Verify Bksv
Test 3C-1-07: Irregular procedure:(Second part of authentication) Verify R0'.
Test 3C-11-01: Regular procedure:Transmittter-DUT-Repeater+Receiver.
Test 3C-11-02: Regular procedure:HPD after writing Aksv.
```

The following is an example of a report for the HDCP compliance test for a source (player).

HDCP Compliance Report

quantumdata

Generator Information	
Model =	882CA
Unit Revision =	A
Unit SN =	6050019
Date =	05042006
Firmware =	20.1883502
Unit Under Test Type =	Player

PCP Selections	
Source_Max_KSV =	0
Source_Authe_Count =	0
Source_Out_OnlyRep =	NO
Sink_1.1Features_Supported =	NO
Sink_Audio_Supported =	NO
Repeater_1.1Features_Supported =	NO
Repeater_Audio_Supported =	NO
Repeater_HPD_Pulse =	NO
Repeater_Max_KSV =	0
Repeater_Out_OnlyRep =	NO

SOURCE TESTS

est 1A-01

- Starting Test 1A-01
- Timestamp:150.49644 secs., Ri' read (both bytes).
- Timestamp: 2.12720 secs., Hot plug detect timer expired.
- Timestamp: 3.41866 secs., Bstatus read.
- Timestamp: 3.42071 secs., Bcaps read.
- Timestamp: 3.42234 secs., Warning. Video Signal is not HDMI mode and is running an H

The following is an example of a report for the HDCP compliance test for a repeater.

HDCP Compliance Report

quantumdata

enerator Information

Model = 882CA
Unit Revision = A
Unit SN = 6050019
Date = 05042006
Firmware = 20.1883610

NIT UNDER TEST INFORMATION (PCP SELECTIONS)

Unit Under Test Type = Repeater
Repeater 1.1 Features Supported = NO
Repeater Audio Supported = YES
Repeater HPD Pulse = YES
Repeater Max KSV = 2
Repeater Out OnlyRep = YES

epeater TESTS Summary (Test 3C1-3C11)

```
-1-01: Regular Procedure Transmitter-DUT-Receiver.
-1-02: Regular procedure:HPD pulse output caused by user operation
-1-03: Irregular procedure.(First part of authentication) New authentication.
-1-04: Irregular procedure:(Second part of authentication) New Authentication.
-1-05: Irregular Procedure (Third part of authentication) New Authentication.
-1-06: Irregular procedure:(Second part of authentication) Verify Bksv
-1-07: Irregular procedure:(Second part of authentication) Verify R0'.
-11-01: Regular procedure:Transmittter-DUT-Repeater+Receiver.
-11-02: Regular procedure:HPD after writing Aksv.
_11_03: Regular procedure: HPD after reading R0'
-11-04: Regular procedure: HPD after starting third part of authentication.
-11-05: Irregular procedure:(Second part of authentication)Verify V'.
Test 3C-11-06: Irregular procedure:(second part of authentication) Device count
-11-07: Irregular procedure:(second part of authentication) Depth.
Test 3C-11-08: Irregular procedure:(second part of authentication) MAX DEVS EXC
```